

OPERATING INSTRUCTIONS FOR THE PA-400

The PA-400 utilizes a pair of 811A tubes, operated zero bias as a class B pull linear amplifier.

The unput and output circuits are designed to use with low impedance unbalanced line.

A grid circuit meter, a plate current meter, and an antenna line current meter are provided on the front panel. These meters are provided for tuning and adjusting the amplifier, and for observation of the unit while in operation.

If the amplifier is terminated in a low impedance non-reactive load, the variable link will load the amplifier to 435 watts input, 300 plate MA. This loading adjustment can be made using carrier from the exciter for driving power. Care should be used when making these initial loading adjustments, in order not to damage the 811A tubes. If the tubes start to show excessive color, the plate voltage should be turned off until the tubes cool. With steady carrier drive, the tubes will show color if the plate voltage and drive is left on more than a few seconds. With SSB voice input, the peak power will be 400 watts input; but the average power will be considerably less as indicated on the plate meter. Antenna line current should be adjusted for maximum, with carrier drive at 400 watts input. This is accomplished by varying the antenna link coupling and resonating the final plate tank condenser. With the amplifier properly loaded, the plate current meter will show a slight dip as the plate tuning condenser passes through resonance.

Another rough indication of proper loading, with voice input, the grid current should be approximately 10% of the plate current.

If the two tone test method of loading the amplifier is used, the operator is referred to May 1952 QST, page 39.

The PA-400 is designed to operate on all amateur bands from 10 through 75 meters. The unit is furnished with 75 meter coils. Coils for other bands are available on order.

Neutralizing procedure for the PA-400 is the same as any other push pull cross neutralized amplifier. A sensitive indicating device should be used as a null indicator. Carrier should be injected from the exciter for neutralizing adjustments. Use enough carrier to supply 50 grid MA to the 811As.

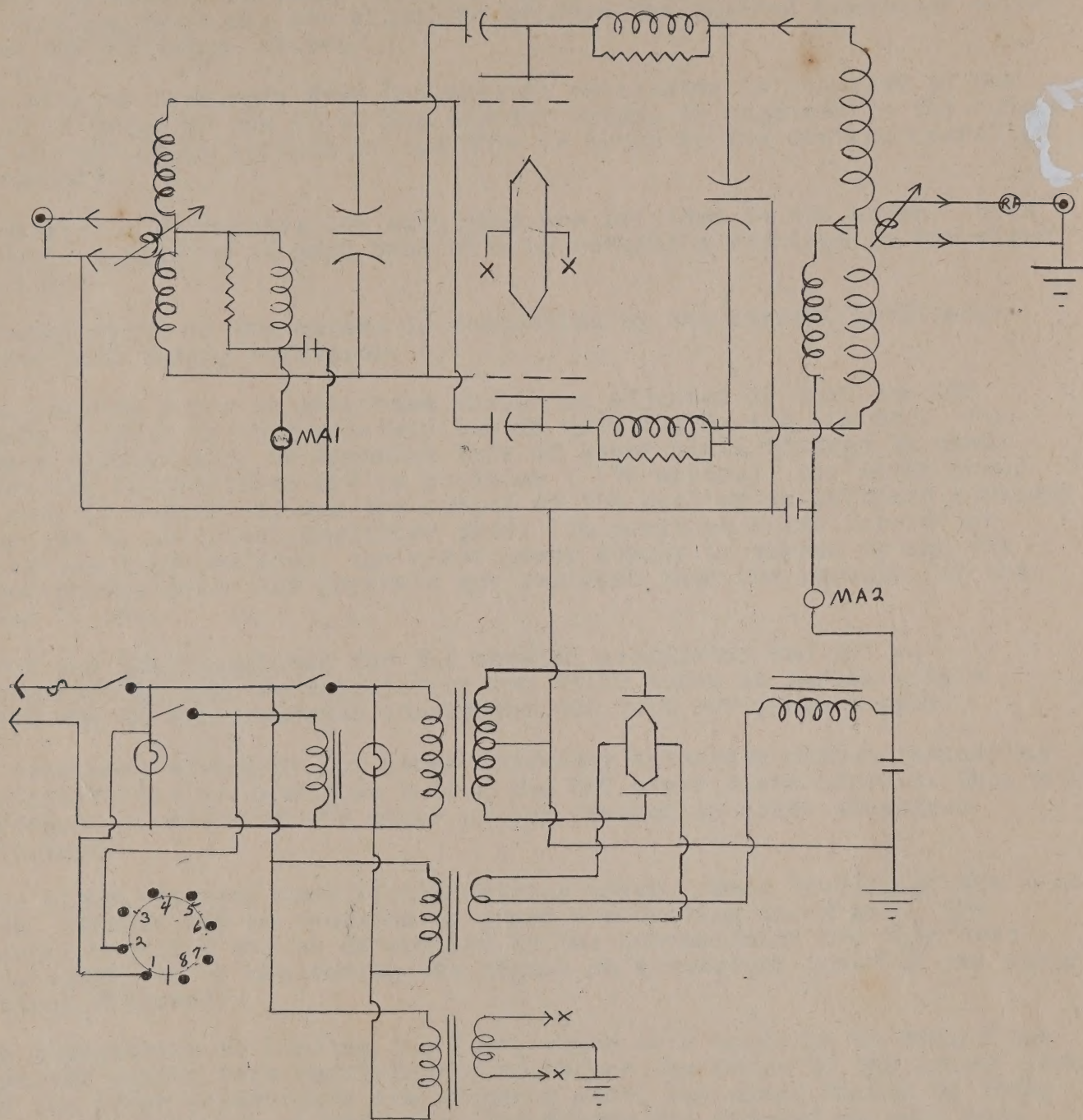
If an SS-75 exciter is used, connect pins 1 and 2 on the octal socket on the rear of the PA-400 to pins 1 and 2 on SO-1 on the SS-75. This connects the plate voltage relay on the PA-400 to the manual control switch on the SS-75.

All components and workmanship, excepting vacuum tubes, are guaranteed by the manufacturer for a period of 90 days from date of purchase.

Electronic Engineering Co.

Wabash, Indiana

Schematic Diagram for PA-400 Linear Amplifier



ELECTRONIC ENGINEERING CO.

Wabash, Indiana .

BSM-3 MIXER

The BSM-3 bandswitching mixer uses two 807 tubes as high level mixers to convert the output frequency of a 4 mc. SSSC exciter to other bands. A 6AC7 crystal oscillator supplies the heterodyning carrier. That is mixed with the 4 mc. ssb signal to produce the desired frequency output from the 807 mixer plates.

The carrier frequency from the crystal oscillator is injected to the control grids of the 807s. The exciter output is injected to the screen grids. The plate circuit of the 807s is tuned to the desired operating frequency.

Separate tank circuits for each band are provided in the mixer. This permits operation in each band with no retuning required in the mixer circuits.

Carrier drive to the mixers is controlled by the crystal oscillator plate tank tuning condenser.

The carrier drive on each band should be adjusted so that the 807 plate circuit is approximately 100 MA with 600 Ep and 150 ESG. The plate circuit will be somewhat less if lower plate voltage is used. When the bandswitches are in position 1 (75 meters), the mixer power supply is turned off and the output of the exciter is switched straight through to the final amplifier grid. In position 2 (40 meters) or position 3 (20 meters), the mixer power supply is turned on and the appropriate coils and crystals are switched into the circuit for the band in use.

300V and 150V regulated for the crystal oscillator and 807 sg respectively, can be supplied by two VR150 tubes in series with a 7500 ohm 20 watt resistor across the 600 volt 807 plate supply.

A receiver, wavemeter, or other frequency selective output indicating device should be used when tuning the 807 mixer plate circuit. This will prevent alignment of the mixer on the carrier or other undesired frequency.

The mixer requires very little driving power. Some loading of the 4 mc. tank circuit may be required to avoid overdriving the mixer. The amount required can be determined by the conventional two tone test procedure, or by monitoring the signal on a receiver tuned to the mixer output frequency.

An alternative to loading the 4 mc. mixer tank would be to detune the exciter output tank sufficiently to reduce the drive to the proper level. If the power connections are properly made, the mixer should be ready for operation with no retuning. The mixers are aligned on each band before shipment.

For receiver carrier injection on the desired band, the mixer plate voltage must be on during the standby period. If insufficient receiver carrier is available, additional coupling can be provided by connecting a wire from pin 3 on SO 2 in the SS-75 to the control grid of the 807 output tube. One turn of insulated wire around the 807 grid pin will provide ample capacity coupling.

Rear Socket Connections

- | | |
|------|-----------------------------|
| 1, 8 | Series power supply primary |
| 1, 7 | 6.3V heater |
| 4 | plus 400 to 750 |
| 5 | plus 150 regulated |
| 6 | plus 300 regulated |
| 3 | ground |

The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

The carrier frequency from the crystal oscillator is injected to the control grids of the 80V tubes. The output of the mixer is taken from the plate circuit of the 80V tubes. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

Separate tank circuits for each band are provided for the mixer. This permits operation in each band with no retuning required in the mixer circuit.

Carrier drive to the mixer is controlled by the crystal oscillator. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

The carrier drive to each band should be adjusted so that the 80V plate circuit is approximately 100 ohms with 500 Hz and 150 kHz. The plate circuit will be approximately 100 ohms with 500 Hz and 150 kHz. The plate circuit will be approximately 100 ohms with 500 Hz and 150 kHz. The plate circuit will be approximately 100 ohms with 500 Hz and 150 kHz. The plate circuit will be approximately 100 ohms with 500 Hz and 150 kHz.

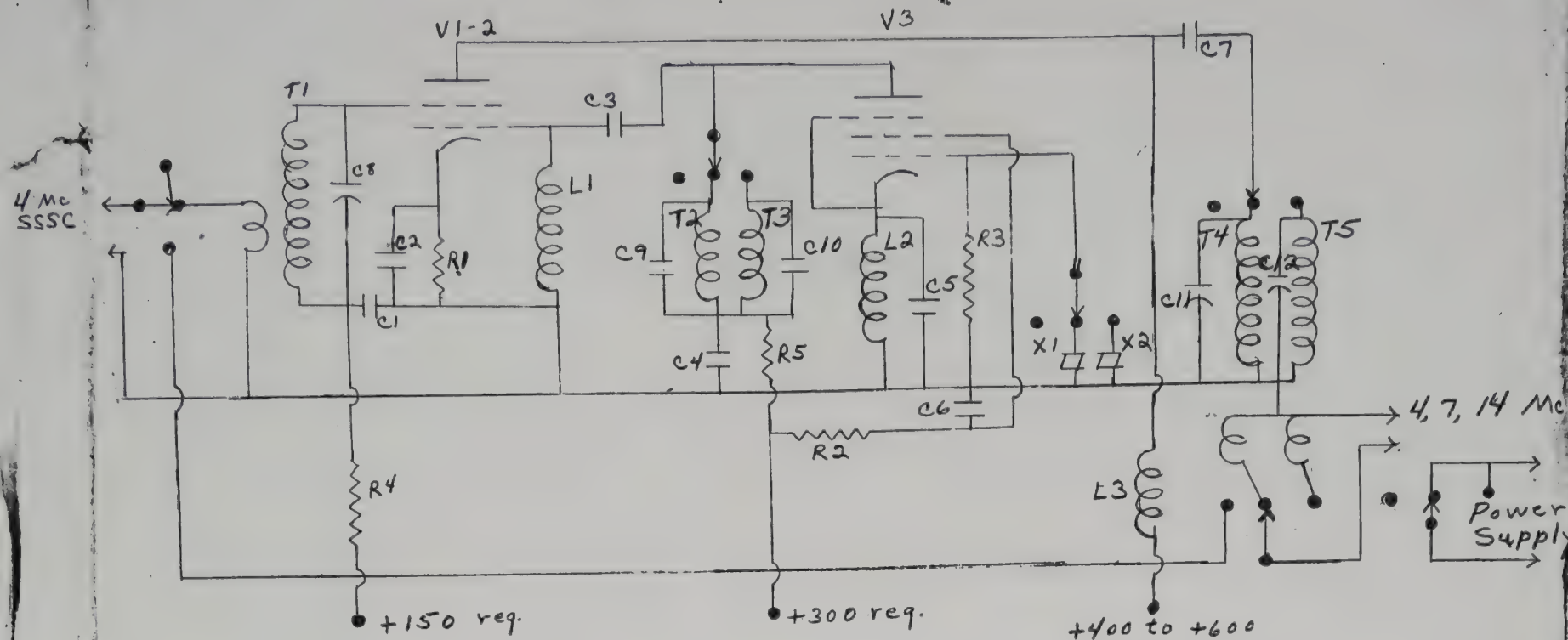
150V and 160V regulated for the crystal oscillator and 80V and 160V regulated for the crystal oscillator. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

A resonant network of output frequency selected output inductance. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

The mixer circuit is very simple. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output. The mixer is a double-balanced mixer using two 80V tubes as input devices. The mixer is designed to convert the output frequency of a 40V oscillator to a 160V output.

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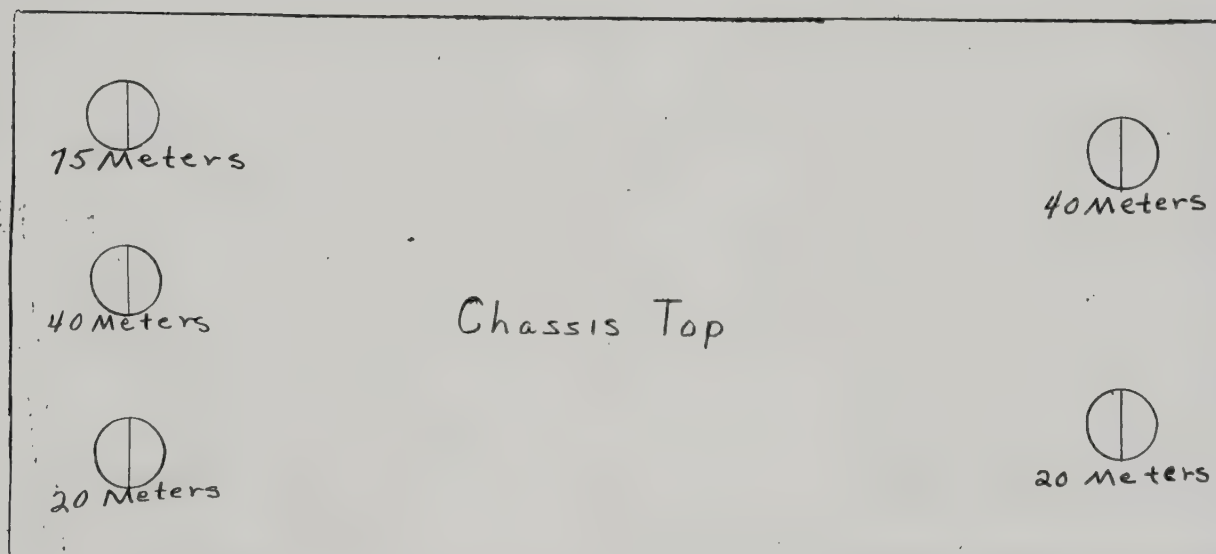


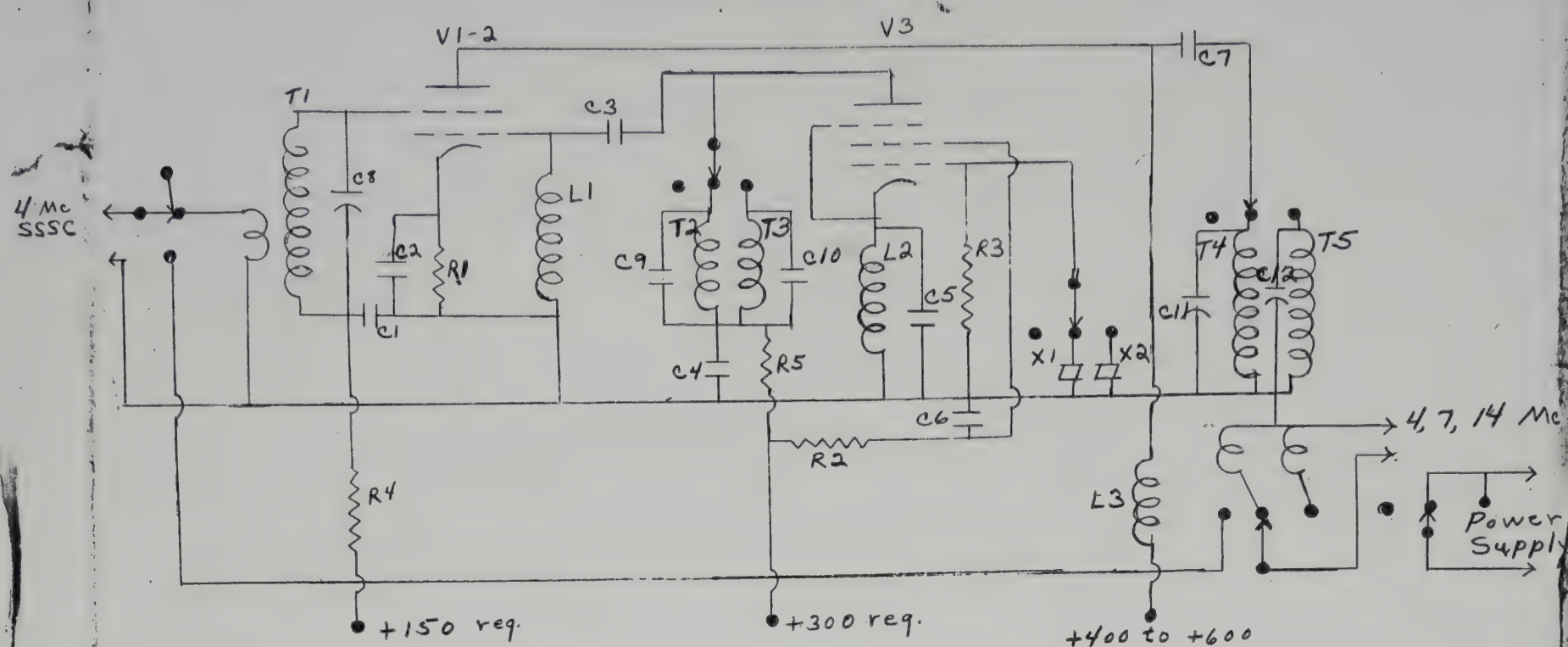
R1	300 ohm 10 watt	C1, 2, 4, 6	.01 uuf mica
R2	57,1000 1 watt	C3	50 uuf mica
R3	100,000 1/2 watt	C5	250 uuf mica
R4	150 ohm 1/2 watt	C7	.01 2500 V mica
R5	1,000 ohm 1/2 watt	C8, 9, 10, 11, 12	100 uuf
T1	4 mc.	L1, 2, 3	2.5 Mh RFC
T2	3.2 mc.	V1, 2	807
T3	10.3 mc.	V3	6AG7
T4	7 mc.	X1	3.3 mc. xtal
T5	14 mc.	X2	10.3 mc. xtal

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BSM-3



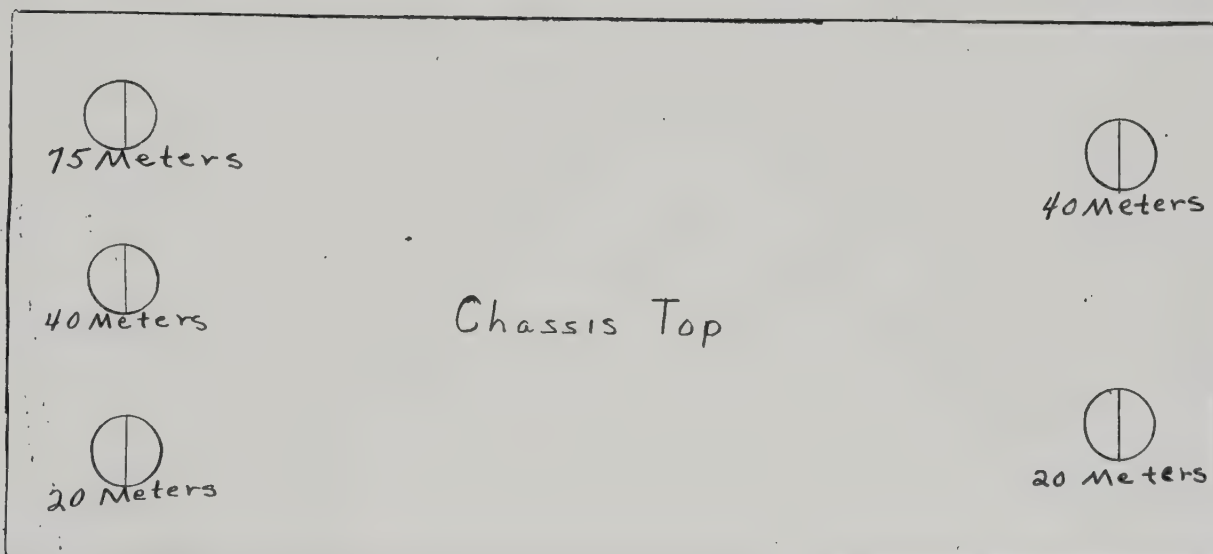


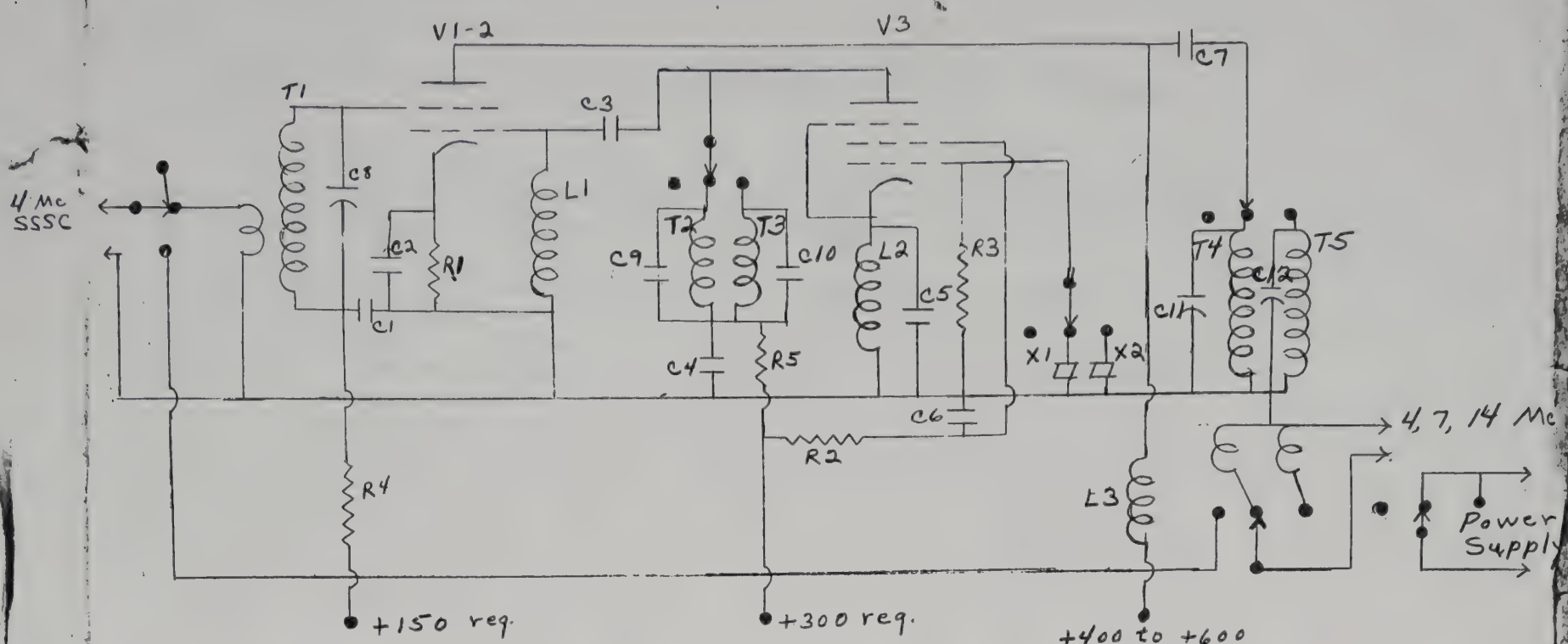
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T1	4 mc.	L1, 2, 3	2.5 Mh RFC
T2	3.2 mc.	V1, 2	807
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BSM-3



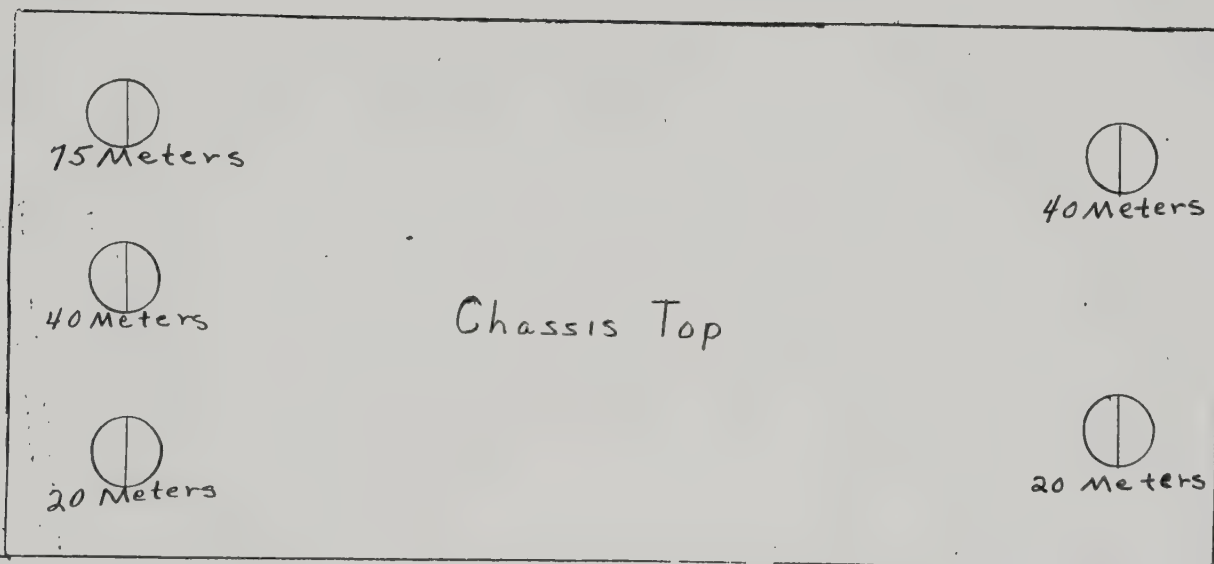


R1	300 ohm 10 watt	C1, 2, 4, 6	.01 uuf mica
R2	57,1000 1 watt	C3	50 uuf mica
R3	100,000 1/2 watt	C5	250 uuf mica
R4	150 ohm 1/2 watt	C7	.01 2500 V mica
R5	1,000 ohm 1/2 watt	C8, 9, 10, 11, 12	100 uuf
T1	4 mc.	L1, 2, 3	2.5 Mh RFC
T2	3.2 mc.	V1, 2	807
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A grid circuit meter, a plate current meter, and an antenna line current meter are provided on the front panel. These meters are provided for tuning and adjusting the amplifier, and for observation of the unit while in operation.

If the amplifier is terminated in a low impedance non-reactive load, the variable link will load the amplifier to 435 watts input, 300 plate MA. This loading adjustment can be made using carrier from the exciter for driving power. Care should be used when making these initial loading adjustments, in order not to damage the 811A tubes. If the tubes start to show excessive color, the plate voltage should be turned off until the tubes cool. With steady carrier drive, the tubes will show color if the plate voltage and drive is left on more than a few seconds. With SSB voice input, the peak power will be 400 watts input; but the average power will be considerably less as indicated on the plate meter. Antenna line current should be adjusted for maximum, with carrier drive at 400 watts input. This is accomplished by varying the antenna link coupling and resonating the final plate tank condenser. With the amplifier properly loaded, the plate current meter will show a slight dip as the plate tuning condenser passes through resonance.

Another rough indication of proper loading, with voice input, the grid current should be approximately 10% of the plate current.

If the two tone test method of loading the amplifier is used, the operator is referred to May 1952 QST, page 39.

The PA-400 is designed to operate on all amateur bands from 10 through 75 meters. The unit is furnished with 75 meter coils. Coils for other bands are available on order.

Neutralizing procedure for the PA-400 is the same as any other push pull cross neutralized amplifier. A sensitive indicating device should be used as a null indicator. Carrier should be injected from the exciter for neutralizing adjustments. Use enough carrier to supply 50 grid MA to the 811As.

If an SS-75 exciter is used, connect pins 1 and 2 on the octal socket on the rear of the PA-400 to pins 1 and 2 on SO-1 on the SS-75. This connects the plate voltage relay on the PA-400 to the manual control switch on the SS-75.

All components and workmanship, excepting vacuum tubes, are guaranteed by the manufacturer for a period of 90 days from date of purchase.

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BSM-3 MIXER

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The carrier frequency from the crystal oscillator is injected to the control grids of the 807s. The exciter output is injected to the screen grids. The plate circuit of the 807s is tuned to the desired operating frequency.

Separate tank circuits for each band are provided in the mixer. This permits operation in each band with no retuning required in the mixer circuits.

Carrier drive to the mixers is controlled by the crystal oscillator plate tank tuning condenser.

The carrier drive on each band should be adjusted so that the 807 plate circuit is approximately 100 MA with 600 Ep and 150 ESG. The plate circuit will be somewhat less if lower plate voltage is used. When the bandswitches are in position 1 (75 meters), the mixer power supply is turned off and the output of the exciter is switched straight through to the final amplifier grid. In position 2 (40 meters) or position 3 (20 meters), the mixer power supply is turned on and the appropriate coils and crystals are switched into the circuit for the band in use.

300V and 150V regulated for the crystal oscillator and 807 sg respectively, can be supplied by two VR150 tubes in series with a 750C ohm 20 watt resistor across the 600 volt 807 plate supply.

A receiver, wavemeter, or other frequency selective output indicating device should be used when tuning the 807 mixer plate circuit. This will prevent alignment of the mixer on the carrier or other undesired frequency.

The mixer requires very little driving power. Some loading of the 4 mc. tank circuit may be required to avoid overdriving the mixer. The amount required can be determined by the conventional two tone test procedure, or by monitoring the signal on a receiver tuned to the mixer output frequency.

An alternative to loading the 4 mc. mixer tank would be to detune the exciter output tank sufficiently to reduce the drive to the proper level. If the power connections are properly made, the mixer should be ready for operation with no retuning. The mixers are aligned on each band before shipment.

For receiver carrier injection on the desired band, the mixer plate voltage must be on during the standby period. If insufficient receiver carrier is available, additional coupling can be provided by connecting a wire from pin 3 on S0 2 in the SS-75 to the control grid of the 807 output tube. One turn of insulated wire around the 807 grid pin will provide ample capacity coupling.

Rear Socket Connections

- | | |
|------|-----------------------------|
| 1, 8 | Series power supply primary |
| 1, 7 | 6.3V heater |
| 4 | plus 400 to 750 |
| 5 | plus 150 regulated |
| 6 | plus 300 regulated |
| 3 | ground |

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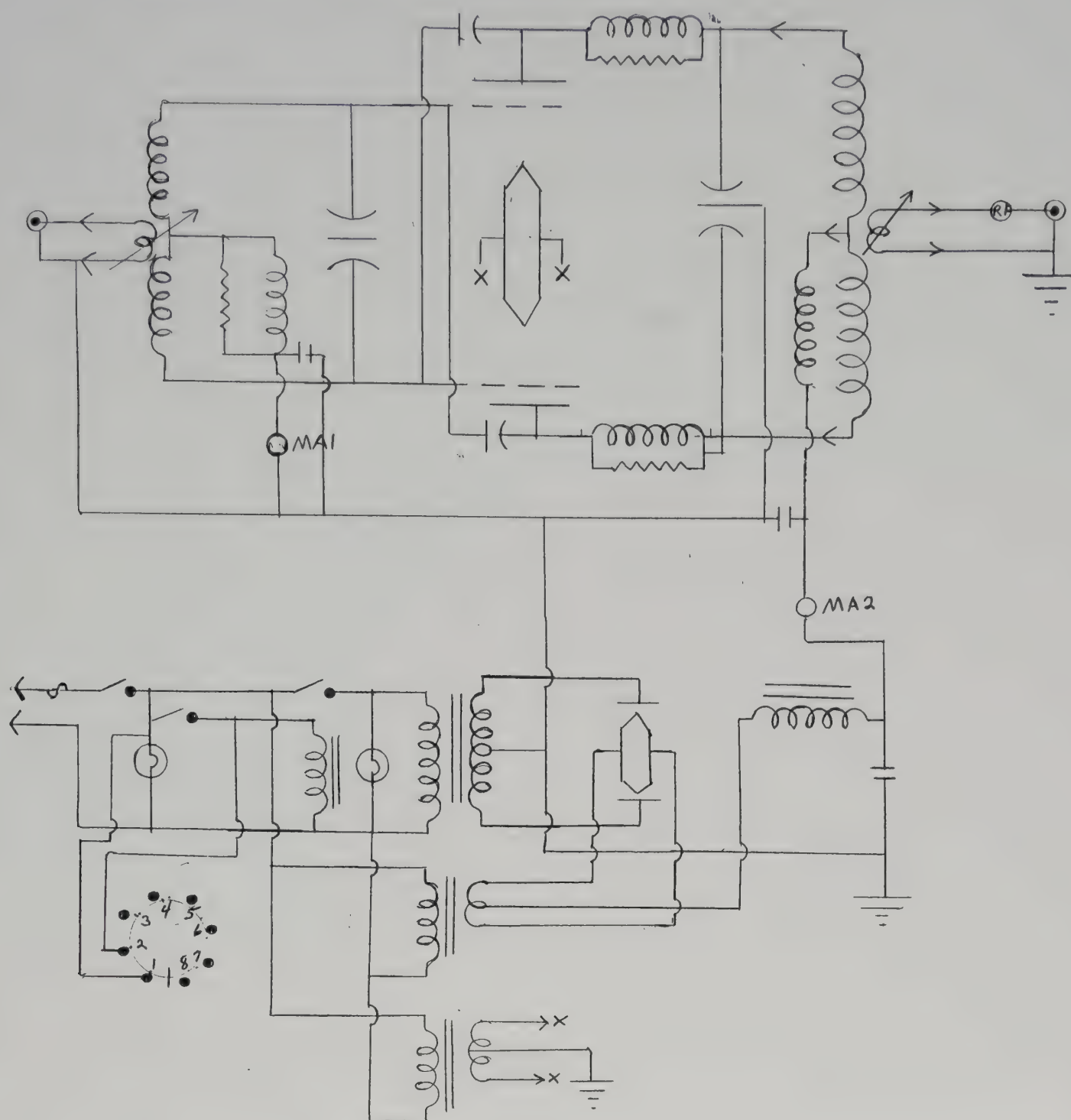
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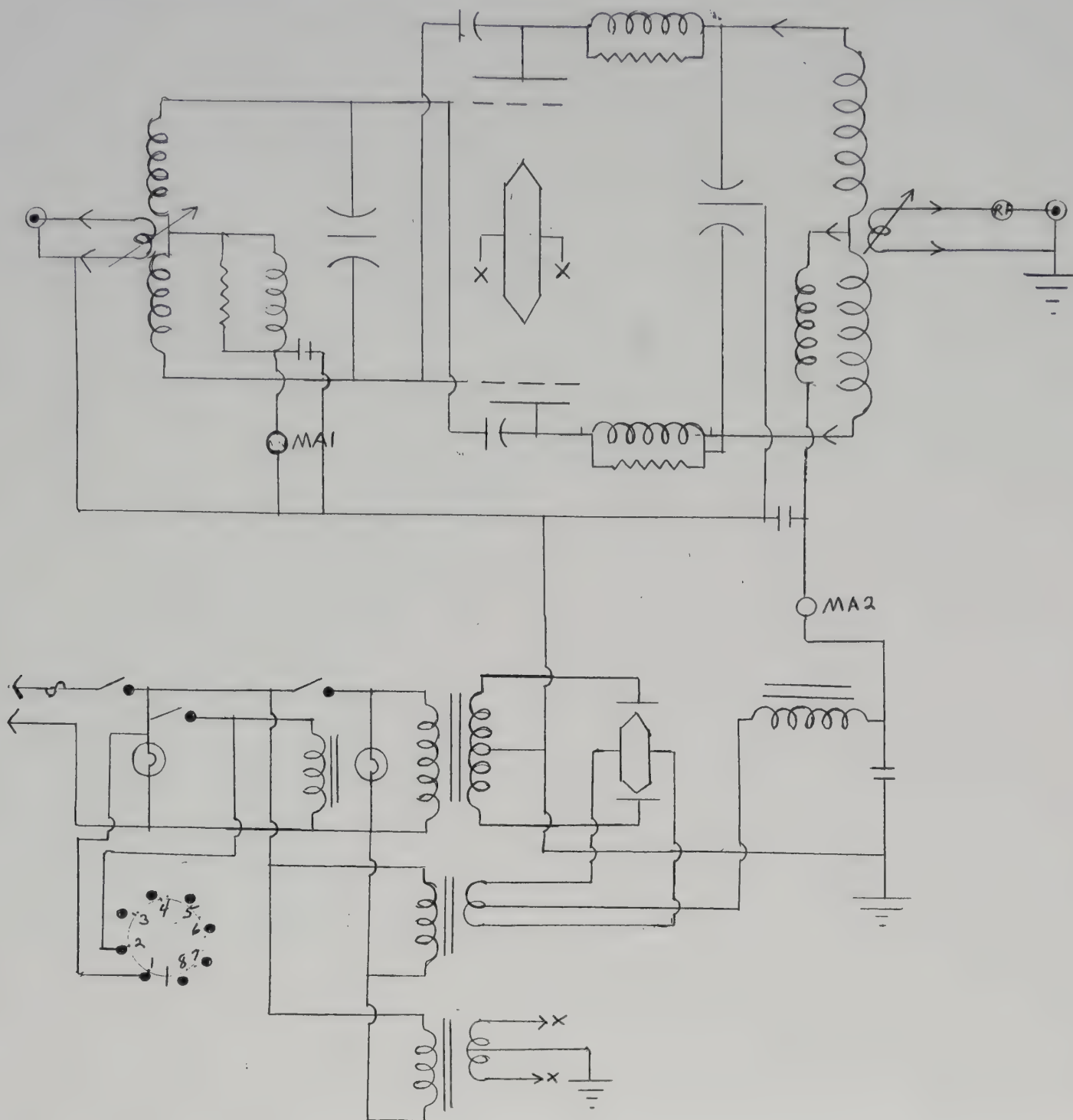
Schematic Diagram for PA-400 Linear Amplifier



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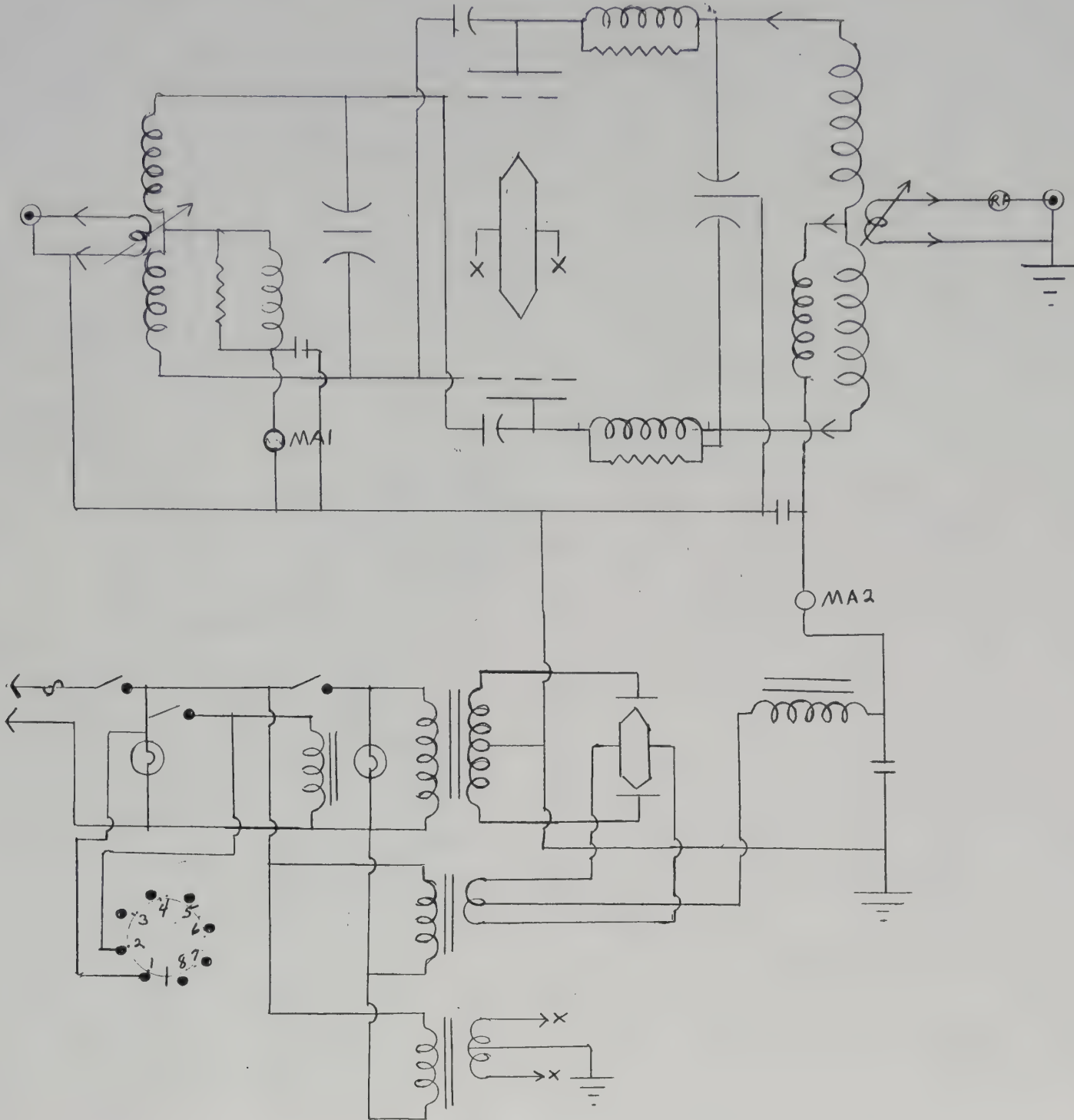
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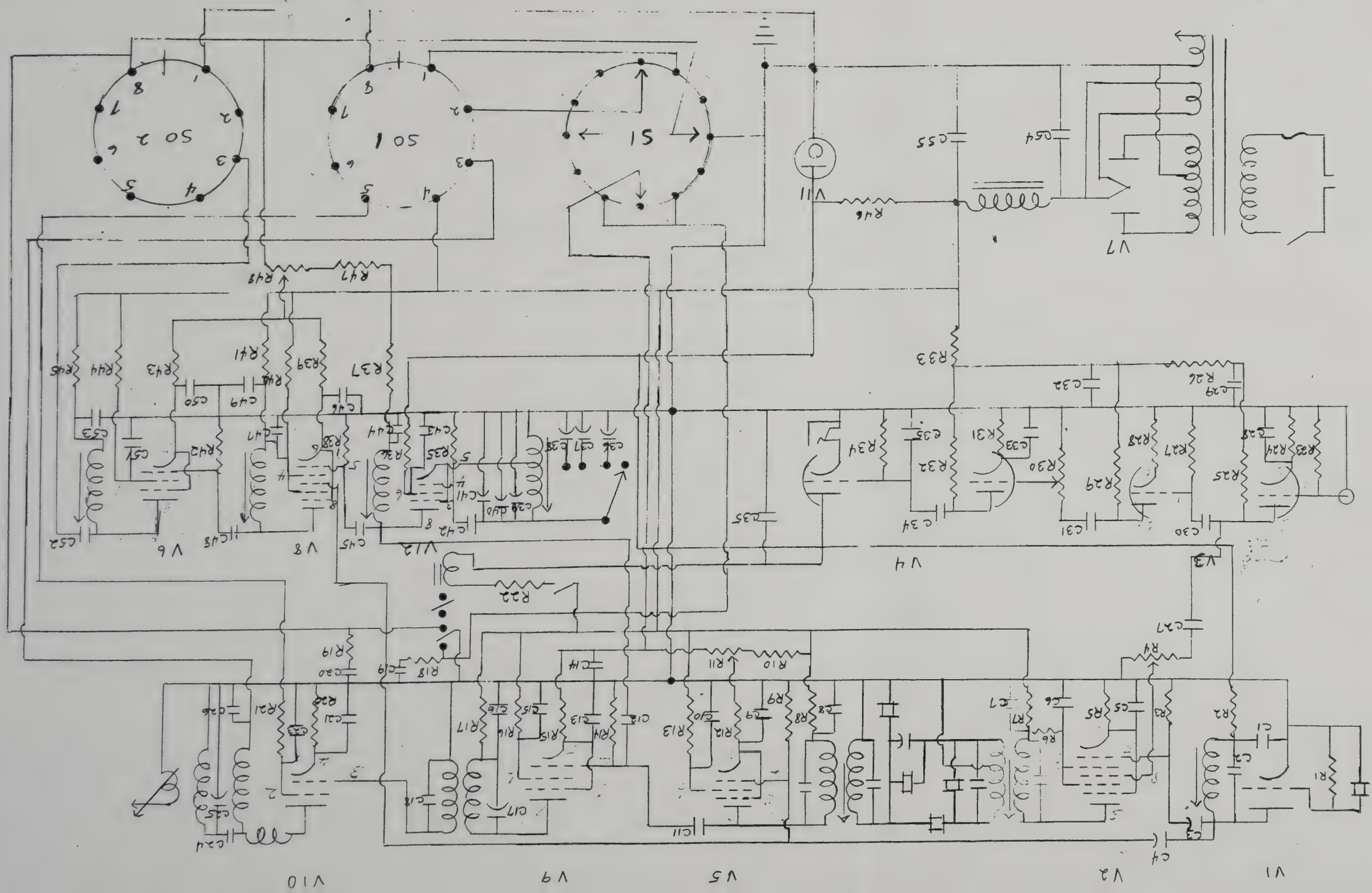
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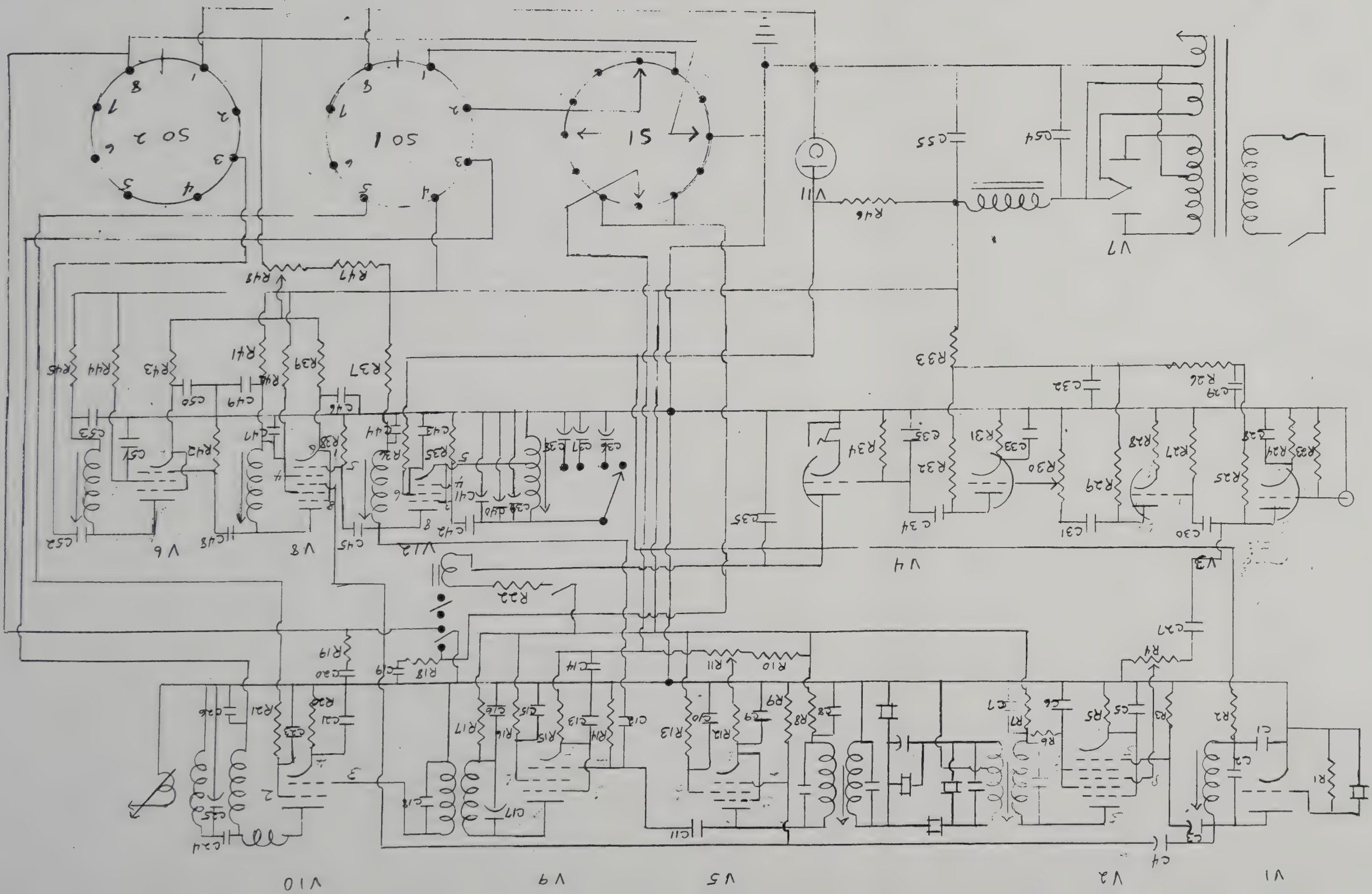
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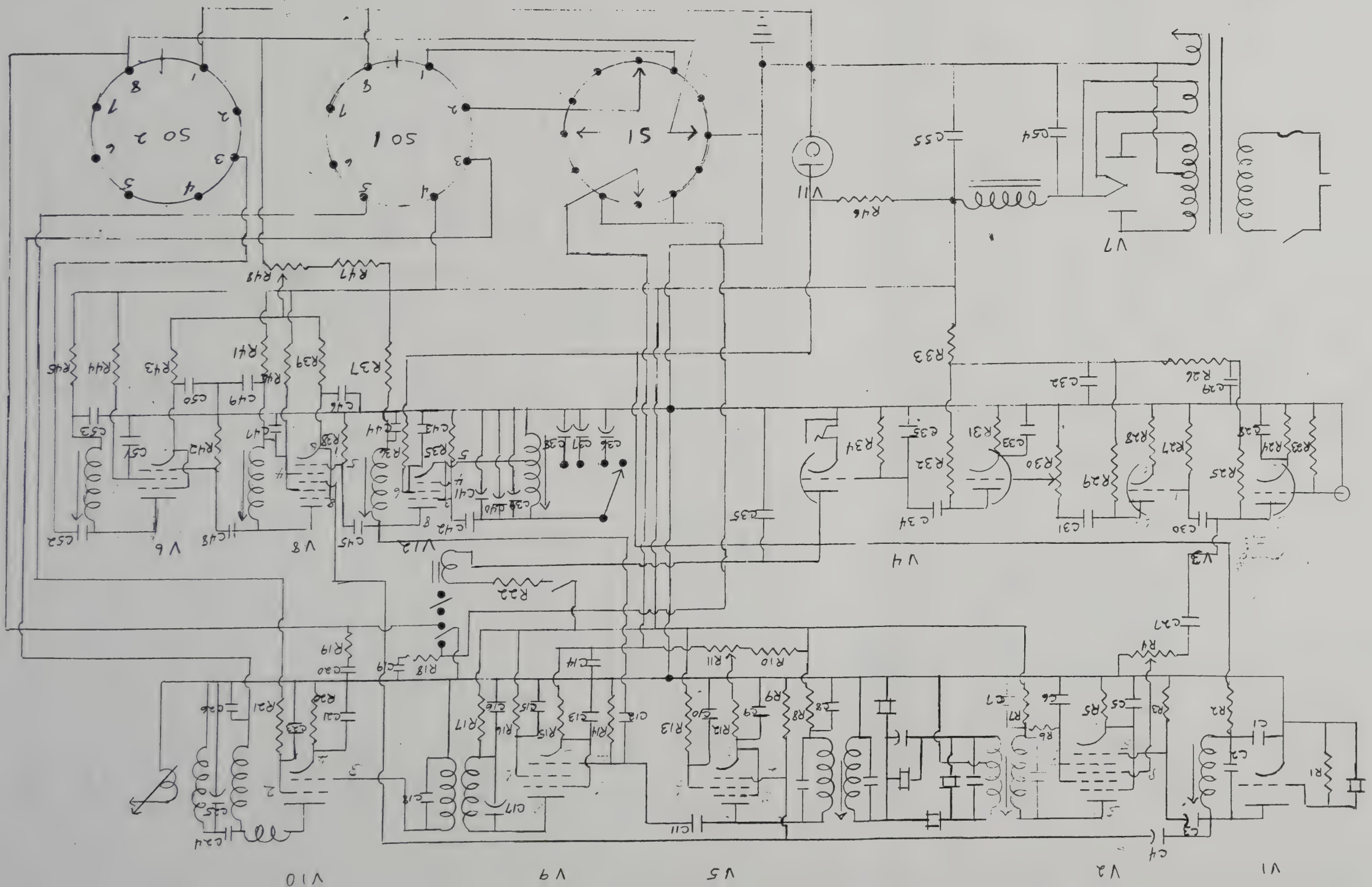


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TUBE SOCKET VOLTAGES ON SS-75

TUBE	PIN							
	1	2	3	4	5	6	7	8
V1-6J5	0	0	75	75	0	150	6.3 ²	0
V2-6SA7	0	6.3 ²	300	100	0	5	0	0
V3-6SL7	0	115	2	0	115	2	6.3 ²	0
V4-6SN7	0	70	3.4	-.4	110 ¹ 0	0	6.3 ²	0
V5-6SJ7	0	6.3 ²	4.3 ⁴ 60	0	4.3 ⁴ 60	150 ⁴ 250	0	300
V6-6SK7	0	0	5 ³ 250	0	5 ³ 250	140 ³ 250	6.3 ²	300
V7-5Y3	0	312	0	375 ²	0	375 ²	0	312
V8-6SA7	0	0	300	115 ³ 290	0	5.4 ³ 240	6.3 ²	0
V9-6AC7	0	6.3 ²	225 ³ 3.2	0	225 ³ 3.2	275 170	0	300
V10-807	6.3 ²	0	300	0	30 ⁴ 23			
V11-VR150	0	0	0	85	150	0	0	0
V12-6SJ7	0	6.3 ²	0	0	0	85	0	300

KEY

1. Voice control on
2. AC voltage
3. Main control switch in standby position, Receive carrier control full on
4. Transmit carrier full on, 807 loaded

Voltages to be taken with transmit carrier off, audio off, voice control off. Measured from chassis with 1000 OPV meter all voltages are DV and taken with the main control switch in transmit position unless otherwise noted.

The following guarantee applies to the SS-75

All components except tubes are guaranteed by the manufacturer, for a period of 90 days from date of sale.

We will replace free of charge, any components found to be defective due to faulty manufacture, within the 90 day period. Provided the defective component is first returned to us postpaid.

ELECTRONIC ENGINEERING COMPANY

Wabash, Indiana

TUBE SOCKET VOLTAGES ON SS-75

TUBE	PIN							
	1	2	3	4	5	6	7	8
V1-6J5	0	0	75	75	0	150	6.3 ²	0
V2-6SA7	0	6.3 ²	300	100	0	5	0	0
V3-6SL7	0	115	2	0	115	2	6.3 ²	0
V4-6SN7	0	70	3.4	-.4	110 ¹ 0	0	6.3 ²	0
V5-6SJ7	0	6.3 ²	4.3 ⁴ 60	0	4.3 ⁴ 60	150 ⁴ 250	0	300
V6-6SK7	0	0	5 ³ 250	0	5 ³ 250	140 ³ 250	6.3 ²	300
V7-5Y3	0	312	0	375 ²	0	375 ²	0	312
V8-6SA7	0	0	300	115 ³ 290	0	5.4 ³ 240	6.3 ²	0
V9-6AC7	0	6.3 ²	225 ³ 3.2	0	225 ³ 3.2	275 170	0	300
V10-807	6.3 ²	0	300	0	30 ⁴ 23			
V11-VR150	0	0	0	85	150	0	0	0
V12-6SJ7	0	6.3 ²	0	0	0	85	0	300

KEY

1. Voice control on
2. AC voltage
3. Main control switch in standby position, Receive carrier control full on
4. Transmit carrier full on, 807 loaded

Voltages to be taken with transmit carrier off, audio off, voice control off. Measured from chassis with 1000 OPV meter all voltages are DV and taken with the main control switch in transmit position unless otherwise noted.

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TUBE SOCKET VOLTAGES ON SS-75

TUBE	PIN							
	1	2	3	4	5	6	7	8
V1-6J5	0	0	75	75	0	150	6.3 ²	0
V2-6SA7	0	6.3 ²	300	100	0	5	0	0
V3-6SL7	0	115	2	0	115	2	6.3 ²	0
V4-6SN7	0	70	3.4	-.4	110 ¹ 0	0	6.3 ²	0
V5-6SJ7	0	6.3 ²	4.3 ⁴ 60	0	4.3 ⁴ 60	150 ⁴ 250	0	300
V6-6SK7	0	0	5 ³ 250	0	5 ³ 250	140 ³ 250	6.3 ²	300
V7-5Y3	0	312	0	375 ²	0	375 ²	0	312
V8-6SA7	0	0	300	115 ³ 290	0	5.4 ³ 240	6.3 ²	0
V9-6AC7	0	6.3 ²	225 ³ 3.2	0	225 ³ 3.2	275 170	0	300
V10-807	6.3 ²	0	300	0	30 ⁴ 23			
V11-VR150	0	0	0	85	150	0	0	0
V12-6SJ7	0	6.3 ²	0	0	0	85	0	300

KEY

1. Voice control on
2. AC voltage
3. Main control switch in standby position, Receive carrier control full on
4. Transmit carrier full on, 807 loaded

Voltages to be taken with transmit carrier off, audio off, voice control off. Measured from chassis with 1000 OPV meter all voltages are DV and taken with the main control switch in transmit position unless otherwise noted.

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ELECTRONIC ENGINEERING COMPANY

Wabash, Indiana

VI

Resistor Values

R1, R9, R10, R35, R44, R47 --- 100M
R2, R3, --- 22M
R4, R30, 250M pot
R5, R12, R39, R43, --- 470
R6 --- 22M 2 watt
R7, R8, R17, R37, R41, R45 --- 1M
R11, R48 000 25M pot
R14, R27, R38, R42 --- 1 meg
R15 --- 220
R16 --- 56M 1 watt
R18, R19, R21 --- 150
R20 --- 300 10 watt
R22 --- 18M 2 watt
R23 --- 2.2 meg
R24, R28, R31 --- 4700
R25, R29, R32 --- 270M K
R26, R33 --- 10M
R34 --- 10 meg
R36 --- 39M
R40 --- 22M 1 watt
R46 --- 20M 10 watt

Condenser Values

C1, C6, C7, C8, C9, C10, C13, C14, C15, C16, C21, C23, C26, C27, C31, C34, C43, C44, C46, C49, C50, C51, C53 --- .01 ufd mica
C2, C30 --- 500 uuf mica
C3, C4 --- 3-30 uuf trimmer
C5 --- .1 paper
C11, C12, C45, C48, C52 --- 50 uuf mica
C17, C18, C36, C37, C38, C39, C50 --- uuf air
C19, C20, C35 --- .1 uf oil filled
C25 --- 365 uuf air
C28, C33 --- 8 uf 25wv electrolytic
C29 --- 10 uf 475 wv electrolytic
C32 --- 20 uf 475 wv electrolytic
C54 --- 10 uf 475 wv electrolytic
C55 --- 40 uf 475 wv electrolytic
C40 --- 600 uuf silver mica
C41 --- 35 uuf air
C42 --- 50 uuf silver mica

Resistor Values

R1, R9, R10, R35, R44, R47 --- 100M
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C2, C30 --- 500 uuf mica
C3, C4 --- 3-30 uuf trimmer
C5 --- .1 paper
C11, C12, C45, C48, C52 --- 50 uuf mica
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C19, C20, C35 --- .1 uf oil filled
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 R26, R33 --- 10M
 R34 --- 10 meg
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Condenser Values

C1, C6, C7, C8, C9, C10, C13, C14, C15, C16, C21, C23, C26, C27, C31, C34, C43, C44, C46, C49, C50, C51, C53 --- .01 ufd mica
 C2, C30 --- 500 uuf mica
 C3, C4 --- 3-30 uuf trimmer
 C5 --- .1 paper
 C11, C12, C45, C48, C52 --- 50 uuf mica
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 C25 --- 365 uuf air
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 C29 --- 10 uf 475 wv electrolytic
 C32 --- 20 uf 475 wv electrolytic
 C54 --- 10 uf 475 wv electrolytic
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 C40 --- 600 uuf silver mica
 C41 --- 35 uuf air
 C42 --- 50 uuf silver mica

Key to Chassis Layout

V 1	6J5	450 Kc crystal oscillator
V 2	6SA7	first mixer
V 3	6SL7	speech amplifier
V 4	6SN7	voice control
V 5	6SJ7	transmit carrier amplifier
V 6	6SK7	Receiver carrier amplifier
V 7	5Y3	rectifier
V 8	6SA7	receiver carrier mixer
V 9	6AC7	second transmit mixer
V 10	807	power amplifier
V 11	VR-150	voltage regulator
V 12	6SJ7	VFO

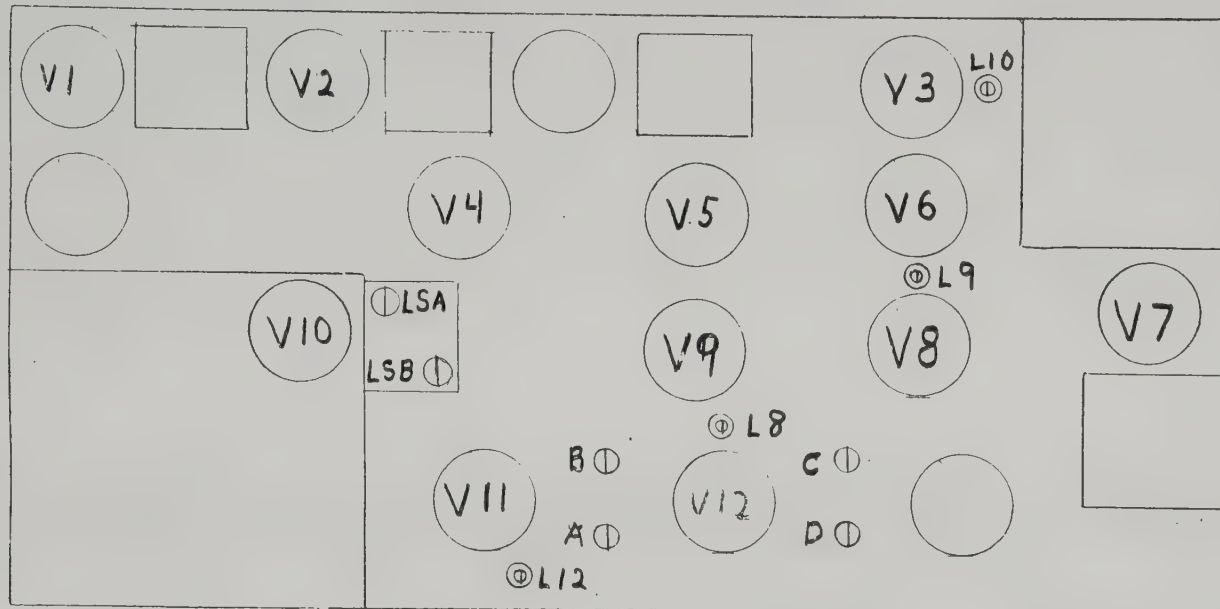
Trimmers

A----band set 4 Mc
 B----band set 3.95 Mc
 C----band set 3.9 Mc
 D----band set 3.85 Mc

Slug Tuned Inductances

L 12	VFO osc. grid
L 8	VFO osc. plate
L 9	receiver carrier mixer plate
L 10	receiver carrier amplifier plate
L 5A	second transmit mixer plate trimmer
L 5B	807 grid trimmer

SS-75 Chassis Layout



NOTES

In some of the earlier units the 807 may show a tendency to oscillate when the load is removed from the plate tank. This may be cured by removing the ground return in the 807 grid circuit tank from ground and inserting a 100 ohm 1/2 watt resistor in parallel with a 500 uuf mica condenser in series with this lead to ground. If the unit is used to drive an amplifier, the resistive load on the tank circuit of the 807 will stabilize the 807, making the above change unnecessary.

The unit will provide approximately 100 watts output using two 807s, a 750 volt plate supply, 300 volts regulated screen supply and 33 volts battery bias. For this class service, short 807 cathodes to ground. Remove ground return on 807 grid tank from ground. Insert bias battery, by-pass bias battery with .01 mica.

Key to Chassis Layout

V 1	6J5	450 Kc crystal oscillator
V 2	6SA7	first mixer
V 3	6SL7	speech amplifier
V 4	6SN7	voice control
V 5	6SJ7	transmit carrier amplifier
V 6	6SK7	Receiver carrier amplifier
V 7	5Y3	rectifier
V 8	6SA7	receiver carrier mixer
V 9	6AC7	second transmit mixer
V 10	807	power amplifier
V 11	VR-150	voltage regulator
V 12	6SJ7	VFO

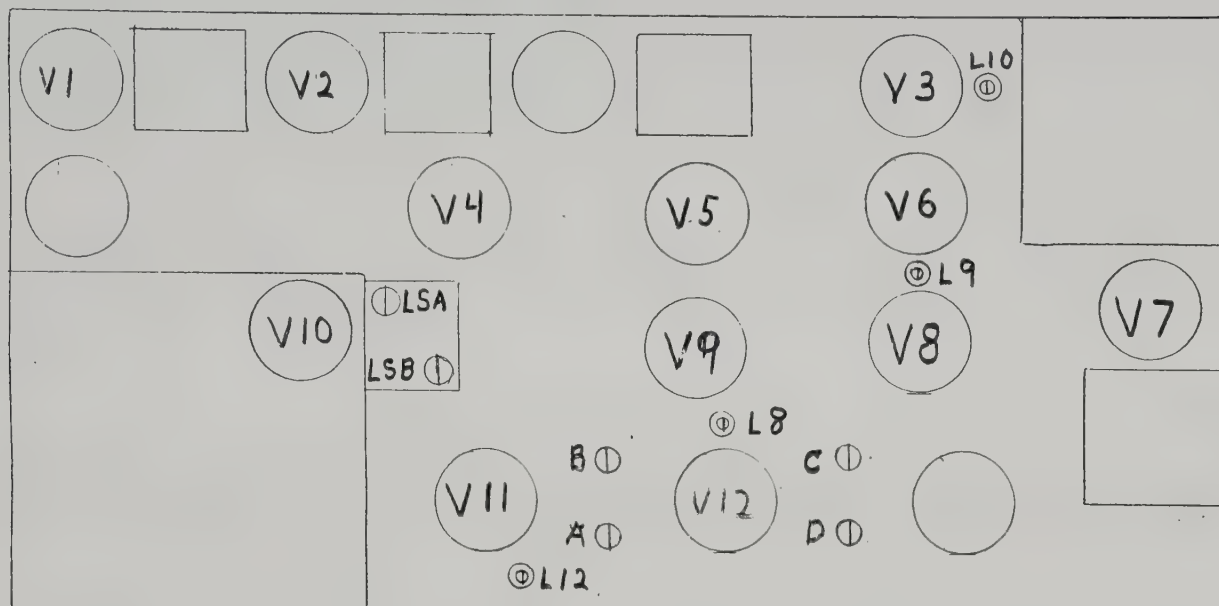
Trimmers

A----band set 4 Mc
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Slug Tuned Inductances

L 12	VFO osc. grid
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L 9	receiver carrier mixer plate
L 10	receiver carrier amplifier plate
L 5A	second transmit mixer plate trimmer
L 5B	807 grid trimmer

SS-75 Chassis Layout



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IF

Key to Chassis Layout

V 1	6J5	450 Kc crystal oscillator
V 2	6SA7	first mixer
V 3	6SL7	speech amplifier
V 4	6SN7	voice control
V 5	6SJ7	transmit carrier amplifier
V 6	6SK7	Receiver carrier amplifier
V 7	5Y3	rectifier
V 8	6SA7	receiver carrier mixer
V 9	6AC7	second transmit mixer
V 10	807	power amplifier
V 11	VR-150	voltage regulator
V 12	6SJ7	VFO

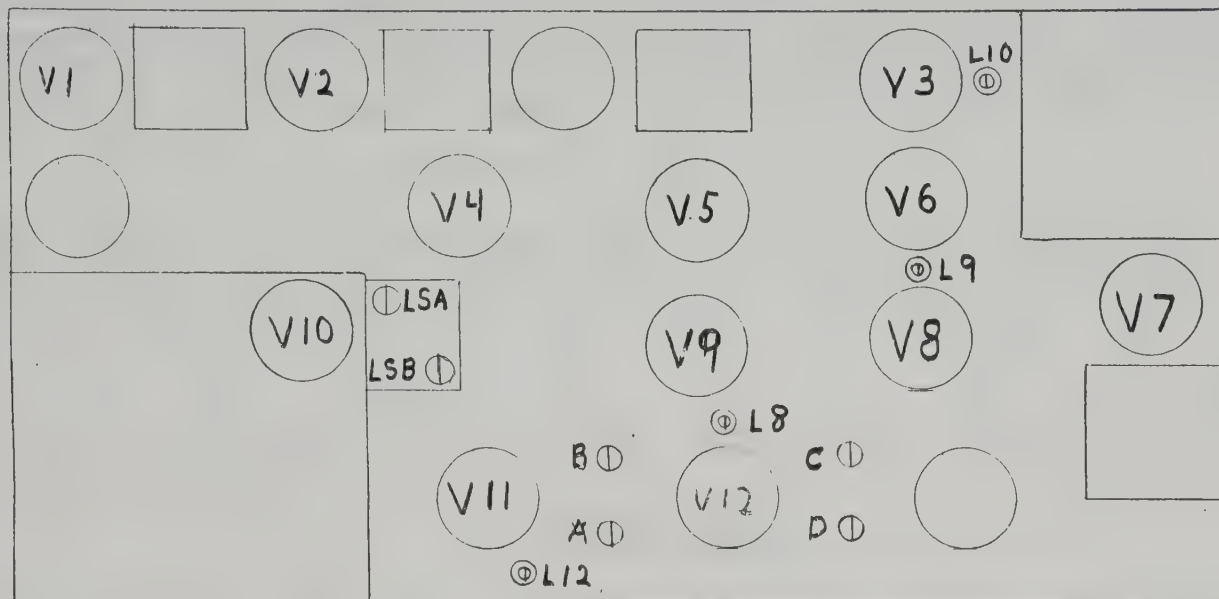
Trimners

A----band set 4 Mc
 B----band set 3.95 Mc
 C----band set 3.9 Mc
 D----band set 3.85 Mc

Slug Tuned Inductances

L 12 VFO osc. grid
 L 8 VFO osc. plate
 L 9 receiver carrier mixer plate
 L 10 receiver carrier amplifier plate
 L 5A second transmit mixer plate trimmer
 L 5B 807 grid trimmer

SS-75 Chassis Layout



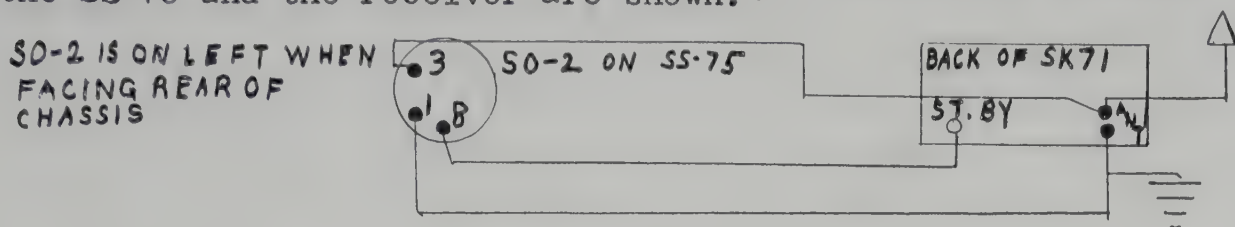
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12

cathodes of the RF and IF stages. The standby receiver switch merely shorts this bias to ground and grounds the ground end of the cathode resistors. The SS-75 provides the high positive bias to silence the receiver in the standby position. A connection is brought out to the socket on the rear of the SX71 to provide external silencing. With a set using this system of silencing, the connections required between the SS-75 and the receiver are shown:-



The connections for carrier insertion to the receiver are also shown. It is possible to use this very efficient method of receiver silencing on any receiver if not provided for, by removing the ground end of the RF and IF cathode resistors from ground. Terminate them all in a common lead and connect them to pin 8 on SO-2 on the SS-75. The high positive cutoff bias is provided for in the SS-75. If this arrangement is used, the spare set of relay contacts may be used to switch the antenna relay.

Power amplifier

When a power amplifier is used, resistor loading should be used across the output tank of the 807 and the grid circuit of the final. The amount of loading required will vary depending on the final tubes used and the class of operation. The loading should be equally divided between the 807 plate and the final grid. In general, use the lowest value of resistance that will provide the required drive to the final. This will provide maximum stability and minimum overall distortion. For class A or AB-1, use just enough loading to maintain stability in the 807 and the final. For AB-2 or B, use all the loading possible and still maintain drive. The single 807 will drive tubes such as 813s to a KW in class B, 304TLs to a KW in AB-1. 10,000 ohms on each end is a good starting value.

Using External Power Supply and Extra 807

Remove cover on 807 shield box, attach plate cap and parasitic choke, plug in the second 807. Retune grid and plate circuit of 807 stage to compensate for added capacity of the second 807. Be sure to retune to signal frequency and not VFO frequency. Pull plug from SO-1. Remove jumpers from pins 3, 4, and 5. Connect 300 volts regulated to pin 5, 600-800 volts to pin 3, and a 5000 ohm 20 watt resistor between pins 1 and 4. Common negative to ground, pin 4, 8 (See notes). *PAGE IV*

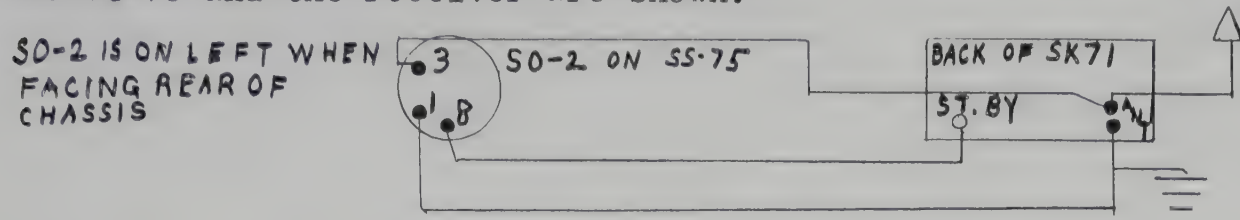
450 Kc Filter

Highest quality slug tuned IF transformers are used in the filter. The filter should remain in alignment indefinitely. Any tampering with the filter will be at the owner's risk.

VFO Calibration

The frequency scale on the VFO is to serve as a reference point only, when adjusting the VFO to the receiver frequency. If calibration is desired, the points may be marked off on the dial scale, or a new scale can be made up from the back side, which is scaled off in four bands.

cathodes of the RF and IF stages. The standby receiver switch merely shorts this bias to ground and grounds the ground end of the cathode resistors. The SS-75 provides the high positive bias to silence the receiver in the standby position. A connection is brought out to the socket on the rear of the SX71 to provide external silencing. With a set using this system of silencing, the connections required between the SS-75 and the receiver are shown:-



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Using External Power Supply and Extra 807

Remove cover on 807 shield box, attach plate cap and parasitic choke, plug in the second 807. Retune grid and plate circuit of 807 stage to compensate for added capacity of the second 807. Be sure to retune to signal frequency and not VFO frequency. Pull plug from SO-1. Remove jumpers from pins 3, 4, and 5. Connect 300 volts regulated to pin 5, 600-800 volts to pin 3, and a 5000 ohm 20 watt resistor between pins 1 and 4. Common negative to ground, pin 8 (See notes). *PAGE III*

450 Kc Filter

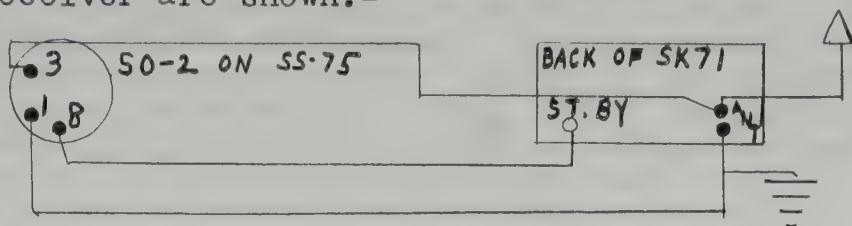
Highest quality slug tuned IF transformers are used in the filter. The filter should remain in alignment indefinitely. Any tampering with the filter will be at the owner's risk.

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cathodes of the RF and IF stages. The standby receiver switch merely shorts this bias to ground and grounds the ground end of the cathode resistors. The SS-75 provides the high positive bias to silence the receiver in the standby position. A connection is brought out to the socket on the rear of the SX71 to provide external silencing. With a set using this system of silencing, the connections required between the SS-75 and the receiver are shown:-

SO-2 IS ON LEFT WHEN
FACING REAR OF
CHASSIS



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Power amplifier

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450 Kc Filter

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VFO Calibration

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back of the chassis. This should be adjusted to suit the individual requirements.

Receiver Carrier Insertion

To tune in a SSSC signal, set up the receiver in the regular AM position. Tune the sideband signal for maximum deflection on the S meter. Turn the receiver carrier control up to about 3/4 on. Adjust VFO to the frequency. Readjust the carrier insertion level to approximate strength of the SSSC signal, then tune the VFO carefully until the voice clears up. The report on the SSSC signal is at the carrier insertion point that the S meter indicator is stable with modulation. If the receiver has been tuned properly, no further adjustments on the receiver are required. It is desirable, in case of interference, to run more carrier into the receiver than is ordinarily necessary. The carrier insertion control may also be used as the audio level control. Once the signal is tuned in on the receiver, the transmitter is automatically "on frequency". Receiver carrier insertion is an exclusively patented feature of the SS-75. To match receiver line, adjust slug at rear of chassis next to power transformer, for maximum output to receiver.

CW Operation

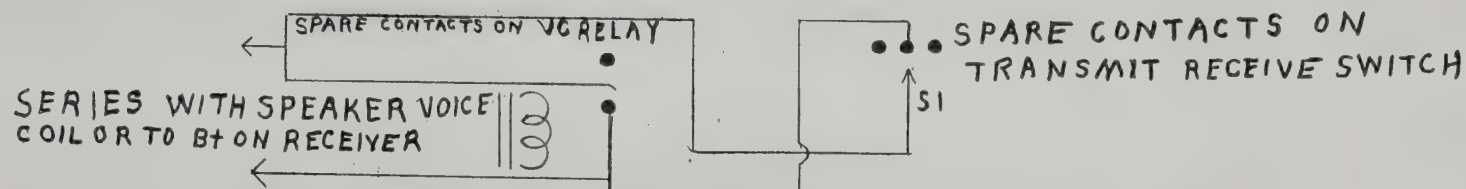
It is necessary with this type of CW operation, where the voice control is keyed, to either; reverse key connections so that the key down, opens circuit; or use a keying relay. The key jack is on the rear of the chassis. To operate CW, insert carrier to the exciter. Turn audio gain off, voice control on. This will permit breakin CW operation.

Warmup Period

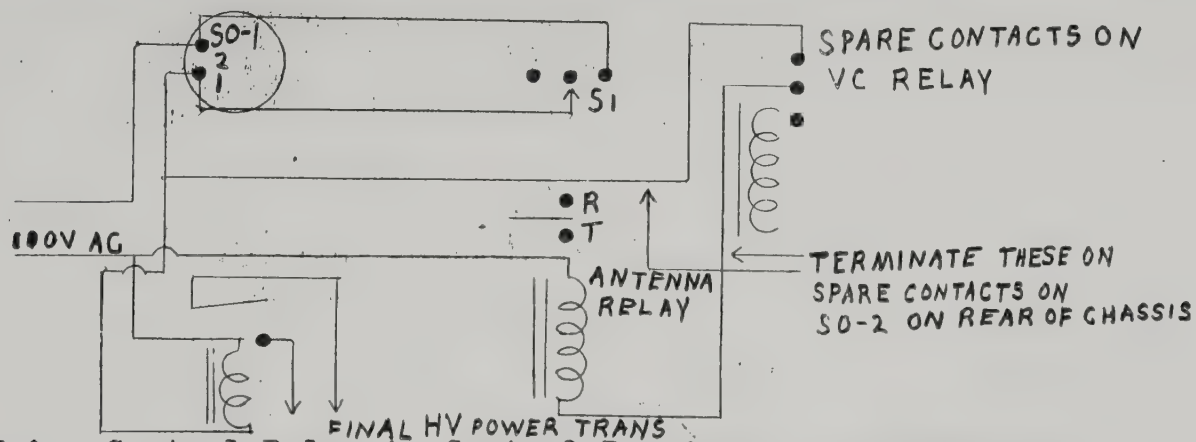
The unit can be put in operation from a cold start. However some frequency drift will occur until the unit has reached operating temperature.

Voice Control Circuits

Voice control circuit to open speaker voice coil circuit or receiver B+ during transmit periods:-



Relay circuit using voice control relay to switch antenna relay:-



To Use Voice Control Relay to Control Receiver as Provided for in the Exciter

Some receivers, such as the SX 72, 75A2, etc. use the standby method of silencing the receiver by applying a high positive bias on the

back of the chassis. This should be adjusted to suit the individual requirements.

Receiver Carrier Insertion

To tune in a SSSC signal, set up the receiver in the regular AM position. Tune the sideband signal for maximum deflection on the S meter. Turn the receiver carrier control up to about 3/4 on. Adjust VFO to the frequency. Readjust the carrier insertion level to approximate strength of the SSSC signal, then tune the VFO carefully until the voice clears up. The report on the SSSC signal is at the carrier insertion point that the S meter indicator is stable with modulation. If the receiver has been tuned properly, no further adjustments on the receiver are required. It is desirable, in case of interference, to run more carrier into the receiver than is ordinarily necessary. The carrier insertion control may also be used as the audio level control. Once the signal is tuned in on the receiver, the transmitter is automatically "on frequency". Receiver carrier insertion is an exclusively patented feature of the SS-75. To match receiver line, adjust slug at rear of chassis next to power transformer, for maximum output to receiver.

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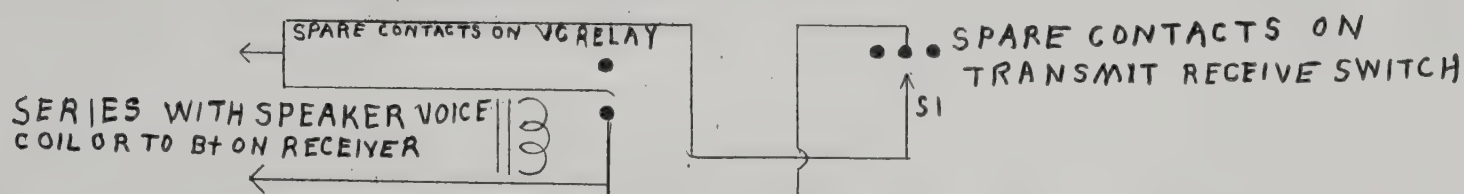
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Warmup Period

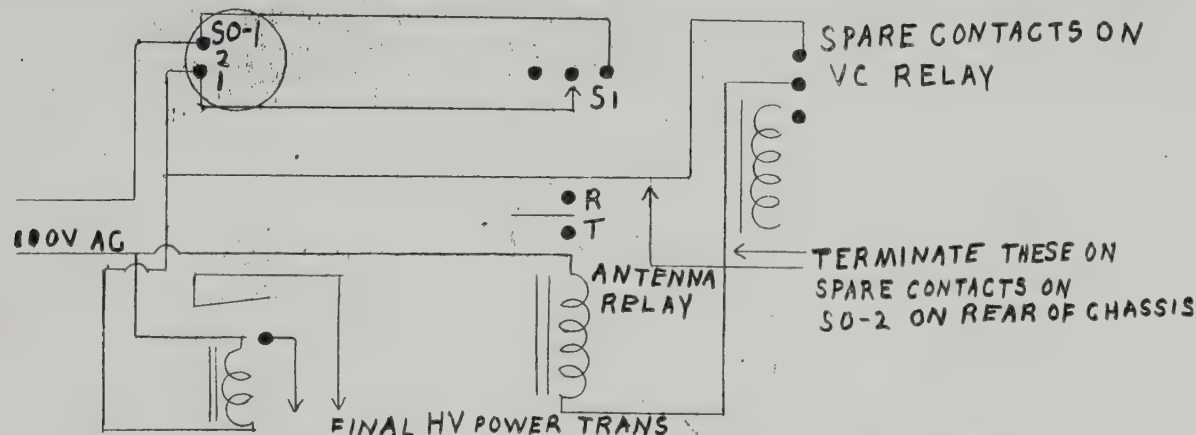
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back of the chassis. This should be adjusted to suit the individual requirements.

Receiver Carrier Insertion

To tune in a SSSC signal, set up the receiver in the regular AM position. Tune the sideband signal for maximum deflection on the S meter. Turn the receiver carrier control up to about 3/4 on. Adjust VFO to the frequency. Readjust the carrier insertion level to approximate strength of the SSSC signal, then tune the VFO carefully until the voice clears up. The report on the SSSC signal is at the carrier insertion point that the S meter indicator is stable with modulation. If the receiver has been tuned properly, no further adjustments on the receiver are required. It is desirable, in case of interference, to run more carrier into the receiver than is ordinarily necessary. The carrier insertion control may also be used as the audio level control. Once the signal is tuned in on the receiver, the transmitter is automatically "on frequency". Receiver carrier insertion is an exclusively patented feature of the SS-75. To match receiver line, adjust slug at rear of chassis next to power transformer, for maximum output to receiver.

CW Operation

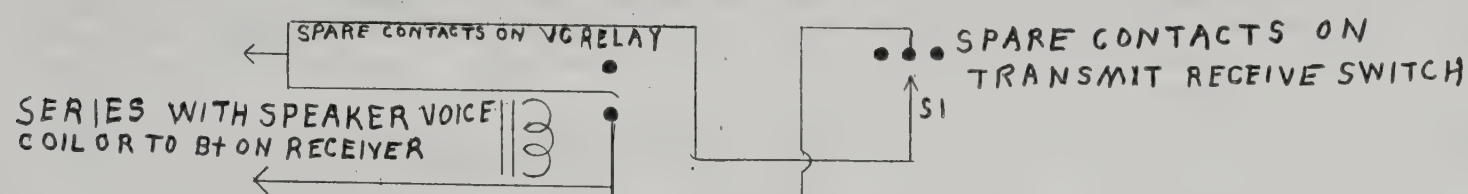
It is necessary with this type of CW operation, where the voice control is keyed, to either; reverse key connections so that the key down, opens circuit; or use a keying relay. The key jack is on the rear of the chassis. To operate CW, insert carrier to the exciter. Turn audio gain off, voice control on. This will permit break in CW operation.

Warmup Period

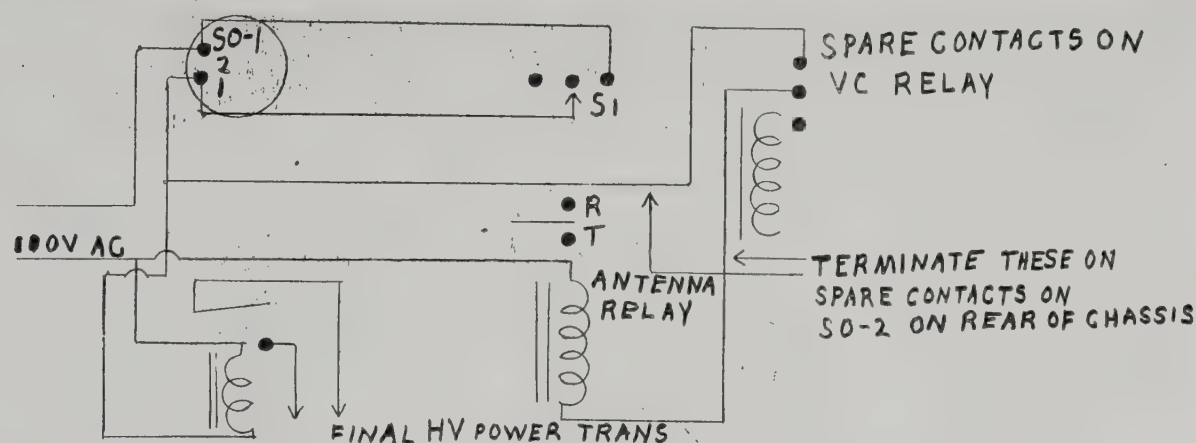
The unit can be put in operation from a cold start. However some frequency drift will occur until the unit has reached operating temperature.

Voice Control Circuits

Voice control circuit to open speaker voice coil circuit or receiver B+ during transmit periods:-



Relay circuit using voice control relay to switch antenna relay:-



To Use Voice Control Relay to Control Receiver as Provided for in the Exciter

Some receivers, such as the SX 72, 75A2, etc. use the standby method of silencing the receiver by applying a high positive bias on the

To Unpack the SS-75

Remove the box containing the SS-75 by cutting edge seams and removing box from the unit. Be careful not to cut through the box into the paint. Remove the two hook bolts from the chassis that appear at the rear of the cabinet. Examine the unit for damage in shipment. If the unit is damaged, contact the Express Co. immediately. Your SS-75 was shipped in perfect condition, and was given an on-the-air check before shipment. Assemble louvers into sides of cabinet.

Operational Instructions

Connect microphone to the amphenol connector at the rear of the chassis. Connect a 15 watt lamp across 807 plate tank. Use receiver with antenna shorted to make tuning adjustments, using the S meter with receiver tuned to the operating frequency. Since it is possible to align the final to the 3550 Kc VFO frequency instead of the sideband frequency of 4 Mc., it is desirable to use the receiver to avoid possible tuning error. Another check to make sure that the circuits following the second mixer are tuned to the sideband frequency: output from the 807 should be obtained when the transmit carrier control is advanced. With the transmit carrier at zero, there should be no output from the 807.

The unit is lined up to use on the high end of the band and will work over a 50 Kc range. If operation lower in the band is desired, it may be necessary to touch up the trimmers on the 4 Mc transformer, which is to the right of the black shield box containing the 807. Again be sure to tune the 4 Mc frequency and not the VFO frequency. The trimmer closest to the black box tunes the plate of the 6AC7 second mixer, and the other tunes the grid circuit of the 807. Connect the 110 line and turn the main control switch to transmit or monitor position. After tube warmup, advance the transmit carrier control until power is indicated in the dummy load. Tune the output control to resonance. With audio gain control about 3/4 advanced, and the transmit carrier control off, speak into the microphone. The dummy lamp should light as you talk. Now tune the signal in on the receiver and, listening to it on the phones, adjust the audio gain for good quality. Do not crowd the audio. After making the standby and carrier insertion connections to the receiver, connect the antenna to the coax connector on the right side of the 807 plate tank. Use a low reading RF ammeter or field strength meter in the antenna coax line. Set the transmit carrier control to the position that you obtained maximum output with the dummy load (this will not be full on). Adjust the coupling link and resonate the output control for maximum line current or field strength. Remove the carrier. The unit is now ready to transmit single sideband.

Voice Control

If a separate receiving antenna is used, and the recommended method of silencing is used, it is only necessary to connect three wires to the receiver from the exciter: one for carrier insertion to the receiver, from pin 3 on SO-2; and the standby connection, from pin 8 on SO-2 to the cathode resistors of the RF stages in the receiver. If another method of receiver silencing is used, it will be necessary to remove the exciter from the cabinet and make the connections desired to the spare contacts on the standby switch and the voice control relay. These may be terminated on the spare pins on either SO-1 or SO-2. To remove the exciter from the cabinet simply remove the front panel screws and the unit slides out. To actuate voice control, turn voice control toggle switch on with main control switch in transmit position. If speaker operation is desired, using voice control, it should be placed so that the speaker pickup on the microphone will be at the absolute minimum to keep the speaker from triggering the voice control. The voice control threshold control is the slotted shaft on the

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